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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,358	01/11/2006	Andrew R Barron	1789-09405	3910
23505 7590 07/23/2009 CONLEY ROSE, P.C. David A. Rose P. O. BOX 3267 HOUSTON, TX 77253-3267				
EXAMINER				
DANG, TRUNG Q				
ART UNIT		PAPER NUMBER		
2892				
NOTIFICATION DATE		DELIVERY MODE		
07/23/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pathou@conleyrose.com

Office Action Summary

Application No.

10/535,358

Applicant(s)

BARRON ET AL.

Examiner

Trung Dang

Art Unit

2892

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 16-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 16-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 28 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitation "wherein said reactive solution is not heated" of claim 28 presents a new subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Note that in the Remarks filed 6/10/2009, applicants stated that "Support for claim 28 can be found in Figures 1 and 2 and in paragraphs [0010] and [0016]-[0020] of the instant application which illustrate and disclose a method for low temperature growth of inorganic materials (e.g., non-heated)." However, the disclosed low temperature growth of inorganic materials does not necessarily mean the reactive solution is not heated since a low temperature process may involve a heating at low temperature. Applicants are reminded that the mere absence of a positive recitation is not basis for an exclusion.

Claim Rejections – 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 7-8, 16-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goda et al. (US 5,132,140) in view of Faur et al. (US 6,613,697) and Liang et al. (US 2002/0173170), all of record.

Regarding claim 1, with reference to Fig. 3, Goda teaches a method for depositing an inorganic material (silicon dioxide) from a reactive solution onto a silicon substrate, comprising:

immersing said silicon substrate into the reactive solution of H_2SiF_6 ; and
regenerating said reactive solution through pump 8 and filter 7 to allow for continuous growth of said inorganic material onto said substrate (col. 5, lines 30-55, EXAMPLE 4 for a substrate being a silicon wafer, and claims 6-8).

Goda differs from the claims in not disclosing the step of chemically treating said substrate to activate growth of said inorganic material as claimed.

Faur teaches a widely used RCA cleaning of a silicon wafer performed prior to a liquid phase deposition (LPD) of silicon dioxide on the surface of the silicon substrate, comprising: a standard SC1 step using $\text{NH}_4\text{OH}:\text{H}_2\text{O}_2:\text{H}_2\text{O}$ (1:1:5) volume parts solution and a standard SC2 step using $\text{HCl}:\text{H}_2\text{O}_2:\text{H}_2\text{O}$ (1:1:6) volume parts solution (col. 8, lines 5-22).

It would have been obvious to one of ordinary skill in the art to modify Goda's teaching by performing the cleaning process as suggested by Faur so as to remove contaminants from the surface of the substrate which would hinder the growth of silicon dioxide.

The combined process of Goda and Faur is now differs from the claim in not disclosing a monitoring system for monitor the depletion of silica in the reactive solution.

Liang teaches an apparatus used for LPD of silicon dioxide, which employs an automatic solution concentration monitoring system 109 (Fig. 3) for controlling the reactant concentration (para. [0030]).

It would have been obvious to one of ordinary skill in the art to modify the combined process of Goda and Faur by incorporating the automatic solution concentration monitoring system 109 for controlling the reactant concentration as suggested by Liang for the purpose of controlling the reaction conditions because it is known the deposition rate and the quality of the deposited film depend on the **concentration** of H_2SiF_6 in the reactive solution. Furthermore, it is also known the **concentration** of H_2SiF_6 in the solution in turn depends on the amount of silica added according to the chemical reaction (1) noted above. Thus, incorporating the monitor system 109 would continuously monitor the **concentration** of H_2SiF_6 in the reactive solution, and hence the quantity of silica in the reactive solution, and therefore allowing an operator to detect the depletion of silica and adding silica accordingly upon depletion so as to control the film forming process. Moreover, it is within the knowledge of one skilled in the art that concentration of an acid solution is determined by the pH of the

solution. Thus, monitoring the concentration of H_2SiF_6 in the reactive solution by pH measurements as claimed would have been obvious. For the limitation regarding spectrographic analysis, it is well known that relative concentration of a solution is determined by spectrographic analysis (See Fehrenbacher's patent, col. 1, lines 65-67, which is cited merely for the purpose of showing this fact). Thus, employing spectrographic analysis for monitoring the concentration of H_2SiF_6 in the reactive solution would have been obvious to one skilled in the art. Because pH measurement and spectrographic analysis each is known individually as a method for monitoring a concentration of a solution, one skilled in the art would reasonable expect that the use of both techniques to monitor the concentration of H_2SiF_6 in the reactive solution would yield predictable results.

For claim 8, Fig. 3 in Goda shows the recirculating solution passes through filter 7 that has silica particles larger than 1.5 microns filtered inside (col. 7, lines 57-59). Thus, the recirculating solution is saturated again (i.e., regenerated) by the addition of the silica dissolved in the solution.

For claims 17, 19 and 20, although the component ratios of the cleaning solutions and the treating temperature and duration taught by Faur are different from that of recited in the claims, such determination of process parameters would have been obvious to one skilled in the art because it is well settle that, absent a showing of criticality or unexpected result by applicant, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

(CCPA 1955); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d (Fed.cir), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure of either the critical nature of the claimed process parameters or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen variables recited in the claims, the applicant must show that the chosen variables are critical. *In re Woodruff*, 919 F.2d, 1575, 1578, 16 USPQ2d, 1936 (Fed. Cir. 1990).

For claims 21-23, the HF contains in the recirculation solution when reacts with silicon dioxide particles in filter 7 inherently reduces HF and generates H_2SiF_6 according to the chemical reaction (1) recited at col. 5 in Goda.

3. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goda taken with Faur and Liang as applied to claims 1-3, 7-8, 16-27 above, and further in view of Zhao et al. (US 2003/0118064 of record).

The combination of Goda, Faur and Liang teaches a method for depositing an inorganic material from a reactive solution onto a substrate as described above.

The combined process differs from the claims in not disclosing that the LPD of silicon dioxide on a silicon substrate can be applied for the fabrication of a semiconductor nano-chip wherein the silicon dioxide forms an optical waveguide.

Zhao teaches an optical waveguide comprises a nano-ultrafine crystalline Si thin 110 film and silicon dioxide films 104/108 deposited on a Si substrate 102 (Fig. 3).

Thus, employing the LPD process taught by Goda and Faur for the fabrication of the optical waveguide device taught by Zhao would have been obvious to one of ordinary skill in the art because the application of a known process to make a known device would have been within the level of one skilled in the art.

Response to Arguments

4. Applicant's arguments with respect to claims 1-8 and 16-28 as presented in the Remarks dated 06/10/09 have been considered but are moot in view of the new ground(s) of rejection.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao Le can be reached on 571-272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Trung Dang/
Primary Examiner, Art Unit 2892

7/20/09